

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Enhancing Irradiation Tolerance of Steels Via Nanostructuring by Innovative Manufacturing Techniques – Idaho State University

SECTION B. Project Description

Idaho State University, in collaboration with Idaho National Laboratory, proposes to enhance the fundamental understanding of irradiation effects in ultrafine-grained or nanocrystalline steels produced by equal-channel angular pressing (ECAP) or high-pressure torsion (HPT), and to assess the potential application of ECAP and HPT in fabricating materials for application in current and advanced reactors. The project will involve neutron irradiation and post-irradiation examination of bulk nanostructured austenitic and ferritic/martensitic (F/M) steels that are anticipated to have enhanced irradiation tolerance and are produced by innovation and low-cost manufacturing techniques ECAP and HPT.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use/Radioactive Waste Generation – This project will involve neutron irradiation of steels at Advanced Test Reactor (ATR). The amount of materials involved is around 70 grams. After neutron irradiation, the steels will become radioactive. The samples will be transferred to Materials and Fuels Complex (MFC) at Idaho National Laboratory for mechanical testing, and very small samples will be prepared for electron microscopy. The small electron microscopy samples will be finally transferred to Center for Advanced Energy Studies (CAES) in Idaho Falls, Idaho. All three units involved (ATR, MFC, CAES) already have well established procedures and specific offices responsible for handling and disposing radioactive materials.

SECTION D. Determine the Level of Environmental Review (or Documentation) and Reference(s): Identify the applicable categorical exclusion from 10 CFR 1021, Appendix B, give the appropriate justification, and the approval date.

Note: For Categorical Exclusions (CXs) the proposed action must not: 1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, including requirements of DOE orders; 2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities; 3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; 4) adversely affect environmentally sensitive resources. In addition, no extraordinary circumstances related to the proposal exist which would affect the significance of the action, and the action is not “connected” nor “related” (40 CFR 1508.25(a)(1) and (2), respectively) to other actions with potentially or cumulatively significant impacts.

References: B3.6 Siting, construction, modification, operation, and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial development.

Justification: The activity consists of small-scale research aimed at investigating irradiation effects of bulk nanostructured steels.

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) Yes No

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 6/30/2016